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# ULTRASTRUCTURE OF THE EGG OF THE AZALEA CATERPILLAR, *DATANA MAJOR* GROTE & ROBINSON (NOTODONTIDAE)

Gary L. Miller and Michael L. Williams

Department of Entomology, Alabama Agricultural Experiment Station,
Auburn University, Alabama 36849

**ABSTRACT.** Ultrastructure of the eggs of *Datana major* was studied by scanning electron microscopy. Eggs are spheroid (1.03 × 0.78 mm) but slightly broadened toward the base. The chorion surface is highly ornate with a rosette-mosaic pattern surrounding the micropyles. The lateral surface is covered with polygonal areas having aeropyles at the junctions of the ridges surrounding these areas. The presence of three micropyles arranged deltoidally appears to be unique among the Notodontidae.

Due to their importance as both a nursery crop and a landscape plant (Hill et al. 1985), greater attention has been placed on the insect associates of indica azaleas (*Rhododendron indica* (L.)). One serious defoliating pest of indica azaleas is the azalea caterpillar, *Datana major* Grote & Robinson (Notodontidae) (Williams et al. 1984). This caterpillar can be locally abundant and alarming to growers because of its extensive defoliation to azalea plantings. First stage larvae skeletonize the leaf surface while later stages defoliate the plant.

Grote and Robinson first described adults of *D. major* in 1866. Additional literature concerning adult descriptions was summarized by Packard (1895), and descriptions of the eggs and larvae were summarized by Tietz (1972). Previous descriptions of the egg were brief (Dyar 1890, Packard 1895), and the only photograph illustrated eclosed eggs (Kuitert 1958). We more fully describe uneclosed eggs here.

## Methods

Fourteen eggs were field collected and 20 were obtained from 2 females (10 eggs each) in a laboratory colony at Auburn University maintained on fresh indica azalea cuttings in Percival growth chambers at 30°C light and 24°C dark, with a 14L:10D photoperiod. Eggs were washed in a 1% sodium hypochlorite solution, rinsed in distilled water, air dried, mounted on stubs with double-coated cellophane tape and coated with gold-palladium in a Fullam vacuum sputter coater. External morphology was examined with an ISI-SS40 scanning electron microscope (SEM) using an accelerating voltage of 5 kV. Photographs were taken with Polaroid 55 film. Egg dimensions were recorded by using an ocular micrometer in a stereomicroscope, and egg color was estimated from standard color charts in the Munsell Book of Color (Munsell Color Co. 1976). Color estimates were made under "cool white" fluorescent overhead lighting. Ultrastructure measurements were made using the SEM. Thirty-four eggs were observed under the SEM.

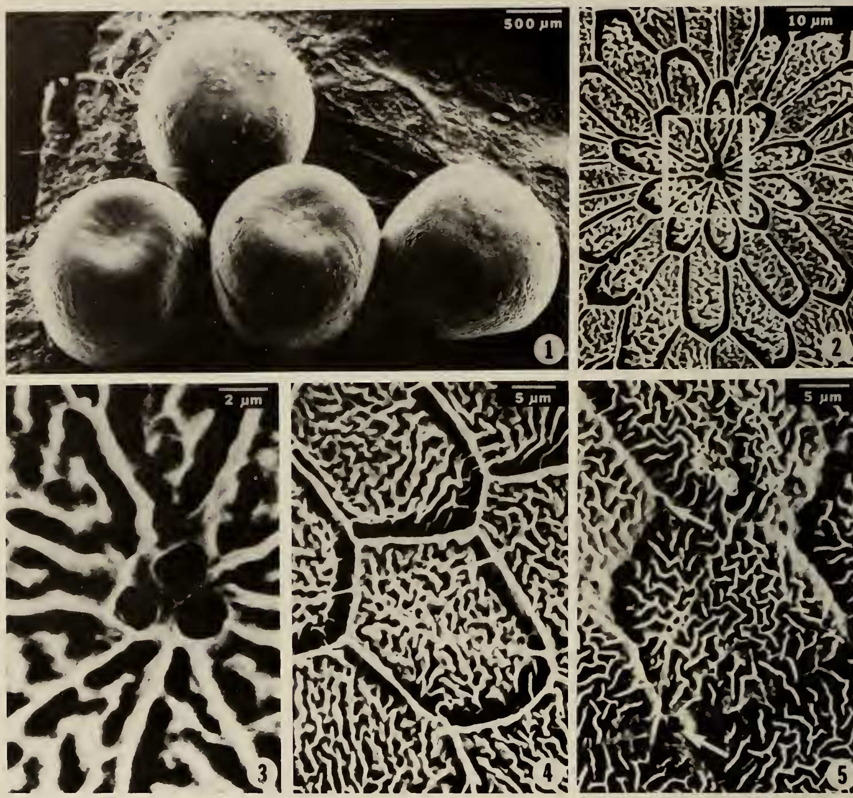
## RESULTS AND DISCUSSION

Eggs of *D. major* are spheroid (Fig. 1), but slightly broadened toward the base. At the broadest point, egg width averaged 1.03 mm (1.00–1.06), and height 0.78 mm (0.76–0.80) (n = 10). Diameter across the top averaged 1.01 mm (1.00–1.06) (n = 10). Although similar in shape and appearance to the eggs of *D. ranaeceps* Guerin-Meneville (Peterson 1963), *D. major* eggs are wider (1.01 mm vs. 0.85 mm) and shorter (0.78 mm vs. 0.85 mm).

The eggs have been described as sublustrous white (Dyar 1890) or uniform white with a large central black spot at the vertex (Packard 1895). When the egg is viewed with the stereomicroscope, the chorion may even appear pearlaceous, a phenomenon which has been observed with other insect eggs (Arbogast & Byrd 1982). When viewed under fluorescent lighting, the eggs appear white to the naked eye, even before eclosion. By comparing eggs with the Munsell Book of Color, a more exact, standard description of the egg is achieved. Eggs were thus estimated to be 2.5 RP 8/2 or No. 2.5 red purple hue, color value No. 8, and chroma No. 2.

The black spot on the vertex mentioned by Packard (1895) is not readily noticeable on newly deposited eggs, but becomes more prominent with embyro development. The caterpillar chews through the chorion in the area of this spot to emerge from the egg. The thickness of the egg shell here is approximately 20 μm. The egg is quite rigid, and resists crushing when pressed between thumb and forefinger. SEM images of eclosed eggs reveal that the egg shell is composed of numerous layers. The innermost layers are densely packed, while outer layers are not as tightly packed, and have larger air spaces.

The chorion surface near the anterior pole forms a rosette-mosaic pattern around a depressed micropylar area (Fig. 2). This area contains three micropyles usually arranged deltoidally (Fig. 3), but sometimes linearly. The micropyles are approximately 2 μm in diameter. Hinton (1981) determined the number of micropyles for 19 species of notodontids but not for the azalea caterpillar. Our finding of three micropyles is the fewest observed to date in this family. The rosette-mosaic pattern on the egg surface represents follicular cell imprints (Margaritis 1985). Each mosaic section is separated by deep grooves bordered by ridges (Fig. 4). These sections may be interconnected by narrow ridges to the surrounding ridges. As the pattern expands from the micropyle, the grooves begin to rise and eventually form only ridges around po-




FIGS. 1–5. **1**, Eggs of *Datana major*; **2**, Rosette-mosaic pattern around micropylar area; **3**, Close-up of highlighted micropyles from Fig. 2; **4**, Surface near anterior pole; **5**, Lateral surface of chorion with aeropyles (arrows).

lygonal areas. These polygons are found throughout the surface of the egg. Aeropyles (Fig. 5) are usually found at ridge junctions, and average 1.7 μm (0.7–2.3 μm) (n = 10) in diameter. The polygonous area between these ridges is highly reticulated. The density of aeropyles gradually diminishes toward the micropylar area. No aeropyles were observed in the rosette-mosaic area.

Photomicrographs of the eggs of *D. ranaeceps* (Peterson 1963) resemble those of azalea caterpillar. As with *D. ranaeceps*, *D. major* eggs were firmly attached to each other but could be easily removed from the substrate. We found shell thickness near that of *D. ranaeceps* (20 μm vs. 23 μm). Additionally, SEM images of the aeropyles and surrounding areas of the *D. ranaeceps* egg (Hinton 1981) closely resemble those of our eggs. However, the number of micropyles differs between *D. ranaeceps* and *D. major* (4 vs. 3).

*Datana ranaeceps* and *D. major* are obviously similar. Margaritis (1985) concluded that most eggshell features are species-specific, and might prove useful in clarifying phylogenetic and taxonomic problems. As our findings show, comparison of egg chorion morphology could indeed be used to reinforce current classification.

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